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THE NEWS LETTER

OF THE

BUREAU OF PUBLIC ROADS

VOL. 1, NO. 9



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THE NEW LETTER

OF THE
LORD OF THE UNIVERSE

FIELD CONTRIBUTIONS WANTED

THE NEWS LETTER WANTS MORE CONTRIBUTIONS FROM THE DISTRICT OFFICES AND THE ENGINEERS IN THE FIELD. THUS FAR THE EDITORS HAVE BEEN FORCED TO DEPEND TOO LARGELY UPON THE WASHINGTON OFFICE FOR COPY, AND THE MOST USEFUL PURPOSE OF A NEWS PERIODICAL - THAT OF PROVIDING A MEDIUM FOR THE EXCHANGE OF INFORMATION AND IDEAS BETWEEN ALL BRANCHES OF THE ORGANIZATION - HAS NOT BEEN FULLY REALIZED.

ARTICLES ARE WELCOMED FROM ALL MEMBERS OF THE BUREAU ORGANIZATION, THE ONLY TEST OF ACCEPTABILITY BEING THE INTEREST OF THE SUBJECT MATTER. THE FIELD OF INTEREST IS WIDE; AND THOSE WHOSE DUTIES BRING THEM DAILY INTO CONTACT WITH CONSTRUCTION OPERATIONS HAVE MANY OPPORTUNITIES TO OBSERVE AND PASS ON TO OTHERS BITS OF INFORMATION THAT MAY PROVE EXTREMELY HELPFUL.

MERE DESCRIPTIONS OF PROJECTS UNLESS THEY ARE UNUSUAL ARE OF LITTLE INTEREST. DESCRIPTIONS OF ENGINEERING PROBLEMS ENCOUNTERED AND THE SUCCESSFUL SOLUTION WORKED OUT ARE ALWAYS WELCOMED WHETHER THE PROBLEM BE GREAT OR SMALL. CONSTRUCTION KINKS, UNUSUAL DESIGNS (IF KNOWN TO BE ADEQUATE), GRAPHS AND TABLES DEVISED AS AIDS IN DESIGN, STATISTICS OF GENERAL INTEREST, STREAM FLOW AND DRAINAGE OBSERVATIONS, PAVEMENT FAILURES (WHERE THE CAUSE IS DEFINITELY KNOWN), INSTANCES OF THE VALUE OF ROAD IMPROVEMENT, TESTS OF MATERIALS IN CORRELATION WITH THEIR BEHAVIOR IN THE ROAD OR STRUCTURE, SUBGRADE DATA, ESPECIALLY IN RELATION TO THE EFFECT UPON THE ROAD SURFACE - ALL THESE ARE VERY ACCEPTABLE SUBJECTS.

ARTICLES SHOULD NOT EXCEED 1,500 WORDS IN LENGTH AND 250 WORDS ARE OFTEN ENOUGH TO COVER THE SUBJECT; AND BREVITY IN ALL CASES IS THE RULE. PHOTOGRAPHS ARE ESPECIALLY DESIRABLE, BUT THEY MUST BE GOOD PHOTOGRAPHS.

INTERESTING FEDERAL AID BRIDGE OVER PEARL RIVER, MISS., COMPLETED
CONTRIBUTED BY JAMES M. ANGLE, ASSOCIATE HIGHWAY BRIDGE ENGINEER,
DISTRICT 8.

UNUSUAL METHODS SUCCESSFULLY EMPLOYED IN THE CONSTRUCTION OF THE FEDERAL-AID BRIDGE OVER THE PEARL RIVER AT JACKSON, MISS., STAMP IT AS ONE OF THE MOST INTERESTING BRIDGE PROJECTS IN WHICH THE BUREAU HAS PARTICIPATED.

THE STRUCTURE WHICH HAS RECENTLY BEEN COMPLETED IS A VIADUCT, 1,008 FEET 2 INCHES LONG, THE MAIN FEATURE OF WHICH IS A THREE-HINGED REINFORCED CONCRETE ARCH OF 180 FEET CLEAR SPAN, 172 FEET CENTER TO CENTER OF END HINGES. THE VIADUCT CONSISTS OF TWENTY SPANS OF 35 FEET 2 INCHES EACH, ONE SPAN OF 39 FEET 2 INCHES IN LENGTH ON THE EAST APPROACH, ONE OF 39 FEET 4 INCHES, AND ONE OF 35 FEET 2 INCHES ON THE WEST APPROACH. THESE SPANS ARE OF THE USUAL REINFORCED CONCRETE GIRDER TYPE, SUPPORTED ON TWO-COLUMN BENTS WITH PILE FOUNDATIONS.

THE THREE-HINGED ARCH OVER THE RIVER CHANNEL WAS USED INSTEAD OF THE MORE USUAL HINGELESS TYPE BECAUSE OF FOUNDATION CONDITIONS. UNDERGROUND MATERIALS AT THE SITE CONSIST OF BLUE (SLATE COLORED) CLAY WITH SAND CLOSELY RESEMBLING MARL. SINCE PILING WAS CONSIDERED NECESSARY ON ACCOUNT OF THE QUESTIONABLE SUPPORTING POWER OF THE FOUNDATION MATERIAL, A HINGELESS ARCH WAS CONSIDERED INADVISABLE. WITH THE EXISTING REQUIREMENTS FOR HORIZONTAL AND VERTICAL CLEARANCES NO CONCRETE STRUCTURE, OTHER THAN AN ARCH COULD BE USED, AND WITH THE HINGELESS TYPE ELIMINATED, THE DESIGNERS TURNED TO THE THREE-HINGED ARCH.

IN THE FOUNDATIONS OF THE ARCH, UNTREATED PILING WAS USED, 169 IN THE EAST-PIER FOUNDATION AND 156 IN THE WEST. IN THE EAST FOUNDATION 108 PILES WERE BATTERED AND 61 WERE VERTICAL, THE ROWS ON THE OUTSIDE, PARALLEL TO THE BRIDGE AXIS BEING VERTICAL, THE NEXT BATTERED. THE REMAINDER WERE BATTERED EXCEPT THE ROW ALONG THE FRONT OF THE FOUNDATION, UNDER THE ARCH-SPRINGING LINES. THESE WERE NECESSARILY DRIVEN VERTICALLY ON ACCOUNT OF THE IMPOSSIBILITY OF DRIVING PILES WITH BATTER IN THE REQUIRED DIRECTION BECAUSE OF THE NEARNESS OF THE COFFERDAM WALL. THE BATTER WAS ONE IN THREE, WHICH WAS APPROXIMATELY PARALLEL TO THE LINE OF THRUST. THE WEST-PIER FOUNDATION WAS ENTIRELY SIMILAR TO THE EAST IN ALL RESPECTS. THE PILES WERE DRIVEN TO PRACTICAL REFUSAL WITH A NO. 2-VULCAN HAMMER ASSISTED BY WATER JETS.

THE PIERS, ABOVE THE TOP OF THE FOUNDATION, WERE OF CELLULAR CONSTRUCTION AND WERE FILLED WITH UNWASHED RIVER SAND. THE FILLING, WHICH WAS DEPOSITED IN ADVANCE OF THE PLACING OF THE CONCRETE IN THE ARCH RINGS, GAVE THE NECESSARY ADDITIONAL WEIGHT TO COUNTERACT PART OF THE HORIZONTAL THRUST. A VERY APPRECIABLE SAVING IN COST OVER A SOLID CONCRETE PIER WAS THUS SECURED.

THE ARCH IS OF THE OPEN-SPANDREL TYPE WITH TEN SPANDREL COLUMNS TO EACH OF THE TWO RIBS. THE RIBS HAVE A SECTION 3 FEET 6 INCHES WIDE THROUGHOUT, WITH A DEPTH OF THREE FEET AT THE CROWN AND SPRINGING LINES, AND FOUR FEET TEN INCHES AT THE QUARTER POINTS. THE CAST-STEEL HINGES HAVE A TOTAL WEIGHT OF ABOUT 20,000 POUNDS. AS THE HINGES ARE COMPLETELY INCASED IN CONCRETE, THE FINISHED ARCH HAS MUCH THE APPEARANCE OF A HINGELESS ARCH, EXCEPT FOR THE THICKENING OF THE RINGS IN THE HAUNCHES, AND THE NARROW CREVICES AT THE CROWN AND SPRINGING LINES WHERE THE EXPANSION MATERIAL SHOWS.

THE MOST INTERESTING FEATURES OF THE CONSTRUCTION WERE THE PLACING OF THE ARCH RINGS IN SIX SECTIONS FOR EACH RIB, WITH TWO KEY SECTIONS IN ADDITION TO THOSE AT THE HINGES, AND THE METHOD EMPLOYED IN LOWERING THE CENTERING. THE CENTERING WAS SUPPORTED ON TWENTY-FOUR SCREW JACKS, AND LOWERING WAS ACCOMPLISHED BY SLOWLY TURNING THESE BY EQUAL AMOUNTS FOR EACH RIB, STARTING WITH THE PAIR UNDER THE CROWN HINGES AND WORKING TOWARDS THOSE AT THE SPRINGING LINES. ON ACCOUNT OF THE VERY SMALL DEFLECTION THAT OCCURRED (LESS THAN ONE-HALF INCH) THE JACKS AT THE CROWN WERE WITHOUT LOAD AND COULD BE REMOVED AFTER THOSE AT THE QUARTER POINTS WERE GIVEN THE FIRST QUARTER TURN.

THE ROADWAY OF THE BRIDGE IS TWENTY FEET WIDE BETWEEN CURBS, AND IS PAVED WITH SHEET ASPHALT. THE COST OF THE STRUCTURE COMPLETE WAS \$164,021.35. DEDICATION CEREMONIES WERE HELD ON THE ANNIVERSARY OF ARMISTICE DAY, NOVEMBER 11, 1925, WHEN THE BRIDGE WAS FORMALLY OPENED TO TRAFFIC AND MADE A MEMORIAL TO THE LATE PRESIDENT WOODROW WILSON.

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U. S. BUREAU OF PUBLIC ROADS 31950

FIGURE 1. - SIDE VIEW OF THE THREE HINGED ARCH SECTION
OVER THE PEARL RIVER.

STATUS OF FEDERAL AID ROAD CONSTRUCTION FUNDS

AS OF JUNE 30, 1926.

D.P.R. - F.A.A.-1
M - JUNE 1926 A

STATES	APPORTIONMENT FROM JULY 11, 1916 TO DATE	2		3		4		5		6					STATES
		ALLOTTED TO PROJECTS (SEE COLUMN 6 FOR DETAILS)		PLACED UNDER CONSTRUCTION		PAID TO STATES		BALANCE OF APPORTIONMENTS		ALLOTMENTS TO PROJECTS (SUBDIVISION OF AMOUNTS SHOWN IN COLUMN 2)					
		FEDERAL AID	MILES	FEDERAL AID	MILES	FEDERAL AID	MILES	NOT ALLOTTED TO PROJECTS (COLUMN 1-2)	NOT YET PLACED UNDER CONSTRUCTION (COLUMN 1-3)	COMPLETED AND PAID		AGREEMENT STAGE			
										FEDERAL AID	MILES	FEDERAL AID	MILES	FEDERAL AID	
ALABAMA	\$ 14,343,455.00	\$ 11,100,976.84	1505.6	\$ 11,100,976.84	1505.6	\$ 9,319,182.48	\$ 3,248,478.16	\$ 3,248,478.16	\$ 8,725,985.09	1298.3	\$ 2,171,090.46	191.2	ALABAMA		
ARIZONA	11,607,249.00	6,859,370.51	823.4	6,859,370.51	823.4	6,253,140.19	2,767,878.33	2,767,878.33	5,663,772.35	729.8	947,904.99	93.3	ARIZONA		
ARKANSAS	11,605,804.00	10,108,369.67	1662.9	9,915,457.29	1631.9	9,102,538.31	1,496,824.33	1,630,346.71	7,666,698.35	1323.0	2,270,002.06	310.4	ARKANSAS		
CALIFORNIA	22,072,815.00	18,833,233.76	1396.1	18,639,342.86	1377.9	16,120,155.30	3,233,575.24	3,373,472.14	13,003,592.30	1058.0	5,160,762.37	284.3	CALIFORNIA		
COLORADO	12,325,812.00	9,646,108.31	981.2	9,313,963.37	959.4	8,129,468.18	2,679,703.59	3,005,842.03	7,127,889.18	745.0	1,958,494.13	203.1	COLORADO		
CONNECTICUT	4,333,681.00	3,243,368.71	175.0	3,021,948.83	165.1	2,352,862.76	1,090,312.29	1,311,732.17	2,100,586.80	117.1	1,090,337.15	56.1	CONNECTICUT		
DELAWARE	2,474,058.00	2,470,554.40	168.2	2,462,243.50	152.5	1,917,073.26	3,503.60	221,814.50	1,781,665.60	124.3	488,126.36	25.0	DELAWARE		
FLORIDA	8,084,954.00	6,470,127.88	412.6	6,470,127.88	412.6	4,843,004.58	1,614,826.12	1,614,826.12	1,894,362.32	132.9	4,645,765.56	279.7	FLORIDA		
GEORGIA	18,431,953.00	18,391,276.95	2479.2	17,700,614.11	2460.9	15,440,114.91	40,676.05	731,338.99	11,664,237.86	1794.0	5,815,045.77	658.4	GEORGIA		
IDAHO	8,559,627.00	8,125,880.22	959.7	7,571,504.03	887.2	6,689,044.87	434,037.78	888,122.97	5,882,112.70	724.7	1,245,136.68	114.5	IDAHO		
ILLINOIS	23,892,159.00	23,381,923.50	1615.3	23,650,095.41	1591.2	22,546,815.03	850,274.50	6,182,102.69	20,613,935.74	1377.7	2,534,082.37	175.1	ILLINOIS		
INDIANA	18,204,355.00	16,373,263.82	1014.0	15,609,705.38	962.3	13,605,093.08	1,831,085.18	2,534,643.62	8,172,925.19	534.3	7,614,772.09	438.7	INDIANA		
IOWA	19,485,563.00	18,026,081.34	2910.3	16,636,931.01	2763.5	13,801,842.35	1,459,481.66	2,768,731.99	11,926,302.13	2114.8	5,178,982.43	742.4	IOWA		
KANSAS	19,464,411.00	17,883,140.14	1942.4	17,206,710.36	1812.5	14,672,787.93	1,581,270.06	2,567,500.64	12,590,489.25	1160.6	3,834,410.31	554.1	KANSAS		
KENTUCKY	13,212,809.00	11,205,226.75	1041.9	11,158,485.09	1038.3	9,910,151.61	2,006,582.25	2,054,323.91	8,402,082.26	758.3	2,679,071.42	275.2	KENTUCKY		
LOUISIANA	9,272,408.00	8,135,730.12	1246.9	7,812,168.71	1217.1	7,033,966.34	1,076,617.88	1,460,233.29	6,144,739.39	1056.9	1,533,806.46	149.4	LOUISIANA		
MAINE	6,464,828.00	5,603,302.50	416.5	5,047,356.63	370.9	4,506,170.58	861,595.50	1,417,471.37	4,132,507.39	303.6	1,195,112.02	34.2	MAINE		
MARYLAND	5,935,057.00	5,901,022.86	511.7	5,365,634.55	454.0	5,146,036.97	24,034.14	559,492.35	5,112,931.22	423.3	260,030.99	28.7	MARYLAND		
MASSACHUSETTS	10,108,726.00	7,911,338.63	442.2	7,653,830.46	421.0	6,794,128.62	2,117,387.37	2,454,835.54	5,657,260.62	374.5	1,036,094.43	51.0	MASSACHUSETTS		
MICHIGAN	20,342,355.00	16,525,545.18	1221.1	16,425,341.18	1209.5	14,563,354.69	3,916,769.82	3,916,769.82	11,827,052.30	963.0	4,293,438.41	221.0	MICHIGAN		
MINNESOTA	19,031,780.00	15,113,116.56	3784.3	13,079,116.56	3773.2	16,332,875.54	481,663.44	512,633.44	15,586,116.56	3181.9	2,429,000.00	576.5	MINNESOTA		
MISSISSIPPI	12,128,018.00	11,565,407.79	1584.7	10,638,330.56	1483.5	9,120,178.60	569,610.21	1,429,687.34	7,414,534.10	1129.0	3,026,122.04	321.2	MISSISSIPPI		
MISSOURI	22,786,436.00	22,380,474.90	2123.9	21,864,311.45	2106.8	16,797,074.03	405,961.10	992,124.55	13,736,014.95	1543.2	7,664,897.22	595.5	MISSOURI		
MONTANA	13,424,896.00	8,873,740.57	1333.3	7,598,428.16	1187.5	6,882,815.49	4,551,144.43	5,936,463.84	6,333,465.99	1054.9	2,462,487.32	263.1	MONTANA		
NEBRASKA	14,635,245.00	12,464,863.97	3214.4	11,984,215.26	3120.4	8,863,931.59	2,180,371.13	2,651,013.74	5,474,202.52	1769.3	6,373,280.06	1312.3	NEBRASKA		
NEVADA	8,795,215.00	8,151,533.26	933.3	7,928,998.55	884.9	7,493,361.19	64,681.74	866,216.45	5,130,934.59	538.8	2,799,565.76	335.8	NEVADA		
NEW HAMPSHIRE	3,163,442.00	2,878,433.12	270.5	2,774,141.85	263.6	2,461,613.23	291,068.88	336,350.15	2,377,450.07	237.6	411,993.17	27.2	NEW HAMPSHIRE		
NEW JERSEY	8,467,420.00	7,767,913.65	331.9	7,617,604.65	321.9	6,762,771.79	693,500.35	843,815.35	5,038,342.21	290.3	2,433,747.44	25.9	NEW JERSEY		
NEW MEXICO	10,972,385.00	8,670,686.83	1561.4	8,213,136.38	1527.4	7,874,693.93	2,371,639.17	2,769,187.52	7,333,657.38	1427.0	807,595.33	98.8	NEW MEXICO		
NEW YORK	34,045,135.00	27,981,137.39	1901.0	26,879,637.39	1764.4	20,677,305.60	4,964,057.61	7,165,557.61	17,911,357.13	1137.0	10,723,330.20	677.4	NEW YORK		
NORTH CAROLINA	15,717,205.00	14,573,329.82	1474.2	14,662,120.07	1448.1	12,874,683.22	737,276.18	1,055,086.93	11,177,337.94	1257.9	3,220,181.51	174.5	NORTH CAROLINA		
NORTH DAKOTA	25,731,746.00	10,244,297.36	3332.8	9,776,368.50	2944.0	6,800,708.71	504,361.08	1,979,630.60	6,031,863.78	2193.1	2,955,639.24	337.1	NORTH DAKOTA		
OHIO	16,053,787.00	26,993,480.84	1803.4	21,847,160.84	1717.6	19,172,566.90	2,738,351.16	3,846,635.16	17,371,787.03	1364.1	4,229,863.92	673.5	OHIO		
OKLAHOMA	10,874,347.00	10,624,852.11	1349.4	14,514,979.97	1276.3	13,660,412.20	1,201,542.25	1,544,807.03	13,159,333.15	1178.9	1,198,285.48	126.3	OKLAHOMA		
OREGON	31,338,781.00	29,633,774.39	1775.9	28,886,488.58	1718.5	25,427,918.97	254,494.89	492,111.50	8,593,214.79	933.2	7,348,336.74	135.2	OREGON		
PENNSYLVANIA	2,667,569.00	2,110,349.06	123.5	1,985,984.06	115.2	1,558,829.06	557,213.94	681,584.94	1,558,829.06	86.7	551,520.00	36.8	PENNSYLVANIA		
RHODE ISLAND	9,801,524.00	9,764,377.98	1742.0	9,643,456.40	1722.7	8,247,733.92	37,146.02	152,067.60	6,765,322.53	1481.9	2,606,621.73	226.4	RHODE ISLAND		
SOUTH CAROLINA	11,156,790.00	10,767,488.42	2334.3	10,468,356.00	2814.5	9,370,161.58	399,301.58	638,434.00	8,603,826.97	2181.2	1,865,019.95	673.5	SOUTH CAROLINA		
SOUTH DAKOTA	15,280,591.00	14,356,266.07	1063.0	13,766,688.07	1028.4	12,077,084.81	885,324.93	1,513,902.93	10,276,584.02	780.0	3,269,684.77	248.4	SOUTH DAKOTA		
TENNESSEE	7,818,779.00	7,818,779.00	5889.0	35,868,294.25	5827.6	31,411,089.09	3,636,943.61	4,738,136.75	27,408,254.72	4320.2	1,263,611.66	154.0	TENNESSEE		
TEXAS	2,667,569.00	2,110,349.06	123.5	1,985,984.06	115.2	1,558,829.06	557,213.94	681,584.94	1,558,829.06	86.7	551,520.00	36.8	TEXAS		
UTAH	11,156,790.00	10,767,488.42	2334.3	10,468,356.00	2814.5	9,370,161.58	399,301.58	638,434.00	8,603,826.97	2181.2	1,865,019.95	673.5	UTAH		
VERMONT	3,268,507.00	2,769,711.14	170.5	2,741,388.17	163.1	2,161,330.47	505,795.86	527,118.83	2,017,639.51	134.5	637,748.13	34.4	VERMONT		
VIRGINIA	13,501,514.00	13,339,057.56	1202.1	13,203,734.93	1191.2	11,407,733.92	102,456.44	291,773.07	6,765,322.53	1481.9	2,606,621.73	226.4	VIRGINIA		
WASHINGTON	10,145,776.00	9,450,109.46	755.0	9,436,509.46	719.7	8,337,939.77	295,266.54	709,266.54	7,782,909.46	668.6	1,902,600.00	63.4	WASHINGTON		
WEST VIRGINIA	7,352,511.00	6,721,213.13	570.3	6,201,983.58	530.0	5,465,643.81	631,291.81	1,150,527.42	4,141,062.65	392.9	2,135,800.43	146.1	WEST VIRGINIA		
WISCONSIN	17,438,815.00	14,587,311.92	2008.3	13,762,180.92	1305.5	11,306,888.89	2,840,303.08	3,676,634.08	10,392,705.73	1592.1	2,169,662.19	217.4	WISCONSIN		
WYOMING	8,566,274.00	7,785,318.07	1357.6	7,704,295.07	1347.2	7,235,302.91	780,956.53	861,978.33	6,040,887.05	1133.5	1,669,055.02	204.0	WYOMING		
HAWAII	1,100,153.00	312,635.18	15.9	312,635.18	15.9	68,516.62	787,517.82						HAWAII		
TOTALS	\$ 671,376,000.00	\$ 597,605,946.65	69365.1	\$ 574,706,177.61	66887.7	\$ 493,300,535.73	\$ 73,769,001.36	\$ 96,668,822.39	\$ 426,172,703.68	52526.6	\$ 144,687,224.79	14303.1	TOTALS		

67,740,070.28

9635.8



RESEARCH WORKERS JOIN THE BUREAU STAFF

CLAUDE L. MCKESSON, MATERIALS AND RESEARCH ENGINEER OF THE CALIFORNIA STATE HIGHWAY COMMISSION, BEGAN PART TIME WORK WITH THE BUREAU ON MAY 20, ON A COOPERATIVE INVESTIGATION OF THE VALUE OF VARIOUS BITUMINOUS TREATMENTS FOR CRUSHED ROCK AND GRAVEL SURFACING. THE INVESTIGATION TO DATE HAS INCLUDED PROJECTS IN CALIFORNIA AND OREGON.

MR. MCKESSON, IN COMPANY WITH MR. ANDERTON OF THE BUREAU, IS NOW STUDYING THE CONSTRUCTION METHODS EMPLOYED ON THE SEVERAL PROJECTS AND THE CONDITION OF VARIOUS TREATMENTS IN ORDER TO SELECT THE MOST PROMISING COMBINATION OF MATERIALS AND METHODS FOR FURTHER INVESTIGATION. LATER THE STUDIES WILL PROBABLY INCLUDE RECORDS OF MAINTENANCE COSTS OF THE VARIOUS TYPES OF TREATMENT. MR. MCKESSON WAS FORMERLY A SENIOR HIGHWAY ENGINEER IN THE BUREAU AND IS PECULIARLY FITTED FOR RESEARCH WORK.

DR. CHARLES TERZAGHI SPECIAL LECTURER ON SOIL MECHANICS DURING 1925-1926 FOR THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY WILL ACCEPT A TEMPORARY APPOINTMENT WITH THE BUREAU ON AUGUST 1 AS RESEARCH CONSULTANT ON SUBGRADE SOIL INVESTIGATIONS. HE WILL BE ENGAGED IN THE INTERPRETATION OF SOIL TESTS IN THEIR RELATION TO SUBGRADE BEHAVIOR, AND IN THE DEVELOPMENT OF NEW AND IMPROVED METHODS FOR DETERMINING THE IMPORTANT CHARACTERISTICS OF SUBGRADE MATERIALS.

DR. TERZAGHI HAS HAD A VARIED EXPERIENCE IN EUROPE AND THE UNITED STATES ON THE CONSTRUCTION OF CONCRETE BUILDINGS, HYDRO-ELECTRIC POWER DEVELOPMENT, IRRIGATION WORKS, AND DIFFICULT FOUNDATION WORK. IN 1916 HE BECAME PROFESSOR OF FOUNDATION ENGINEERING AT THE TURKISH ENGINEERING UNIVERSITY AT CONSTANTINOPLE. IN 1918 HE WAS ASSOCIATED WITH ROBERTS COLLEGE, -CONSTANTINOPLE, AND SINCE 1923 HAS BEEN ACTING HEAD OF THE DEPARTMENT OF CIVIL ENGINEERING AT THAT INSTITUTION. IN 1925 HE WAS GIVEN A LEAVE OF ABSENCE AND BECAME ASSOCIATED WITH THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY AS A SPECIAL LECTURER ON SOIL MECHANICS. HE WILL RETURN TO THAT INSTITUTION IN THE FALL AS AN ASSOCIATE PROFESSOR. IN ADDITION TO HIS EDUCATIONAL WORK, DR. TERZAGHI HAS CARRIED ON A CONSULTING PRACTICE DEVOTED EXCLUSIVELY TO PROBLEMS OF WATER SUPPLY AND DIFFICULT FOUNDATION WORK AND EXTENSIVE INVESTIGATIONS IN THE FIELD OF SOIL MECHANICS. HE IS A PIONEER IN DEVELOPING NEW METHODS OF ATTACK ON THE PROBLEMS OF SOIL MECHANICS AND IS RECOGNIZED AS ONE OF THE FOREMOST AUTHORITIES ON THESE PROBLEMS.

THE HISTORY OF THE

REIGN OF KING CHARLES THE FIRST

IN WHICH ARE CONTAINED THE MOST IMPORTANT AND INTERESTING
PARTS OF HIS REIGN, FROM HIS MARRIAGE TO HIS DEATH

BY JOHN BURNET, ESQ. OF LINCOLN'S INN

IN TWO VOLUMES. THE SECOND VOLUME.

LONDON: Printed by J. Sturges, at the Angel in St. Dunstons Church, 1724.

THE SECOND VOLUME.

IN WHICH ARE CONTAINED THE MOST IMPORTANT AND INTERESTING

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SETTLEMENT OF SWAMP FOUNDATION WITH EXPLOSIVES

CONTRIBUTED BY THE DIVISION OF CONSTRUCTION

COMPILED FROM REPORTS SUBMITTED BY T. M. KEENE, HIGHWAY
ENGINEER, DISTRICT 9.

THE SHAKING DOWN OF A SWAMPY FOUNDATION BY DYNAMITING WAS ONE OF THE INTERESTING FEATURES OF MASSACHUSETTS FEDERAL AID PROJECT 144-A. THE PROJECT INCLUDED A 300-FOOT SECTION OVER A SWAMP WHICH HAD BEEN SETTLING FOR YEARS TO SUCH AN EXTENT THAT IT WAS NECESSARY TO REBUILD IT EVERY SPRING. WHEN THE FEDERAL-AID WORK WAS STARTED IT WAS DECIDED TO SHAKE IT DOWN ONCE FOR ALL BY BLASTING IF POSSIBLE. ACCORDINGLY A TON AND A HALF OF DYNAMITE WAS USED ON THE 300-FOOT SECTION WITH A RESULTING AVERAGE SETTLEMENT OF 4 FEET AND A MAXIMUM LOWERING OF 6 FEET. THE METHODS EMPLOYED ARE DESCRIBED AS FOLLOWS:

TWENTY HOLES IN ALL WERE SUNK UNTIL NO FURTHER PENETRATION COULD BE ACCOMPLISHED WITH THE DRILL WHICH CONSISTED OF A 2-INCH PIPE POINTED ON THE DRIVING END WITH A CONE-SHAPED WOODEN PLUG (FIG. 1). THE PLUG WAS LOOSELY FITTED SO AS TO BE EASILY REMOVED BUT WAS SUFFICIENTLY TIGHT TO PREVENT MUD FROM ENTERING THE PIPE WHILE IT WAS BEING DRIVEN INTO THE GROUND. IT WAS INTENDED TO DRIVE THE PIPE TO THE PROPER DEPTH, THEN FILL IT WITH STICKS OF DYNAMITE AND HOLD THE LATTER IN PLACE WITH A WOODEN RAM ROD WHILE THE PIPE CASING WAS BEING WITHDRAWN. THIS WOULD LEAVE THE WOODEN PLUG AND THE STICKS OF DYNAMITE IN THE GROUND. THIS PROCEDURE, HOWEVER, WAS FOUND TO BE UNSATISFACTORY WHEN THE HOLES WERE EXPLODED. THE SURROUNDING MUCK WAS SOFTENED TO SUCH AN EXTENT THAT IT WAS DIFFICULT TO PLACE THE SUCCEEDING CHARGES. CONSEQUENTLY, THE FOLLOWING PROCEDURE OF LOADING AND EXPLODING THE HOLES WAS SUBSTITUTED,

SECOND-HAND 2-INCH PIPE COSTING ABOUT TWO CENTS A LINEAL FOOT WAS DRIVEN TO REFUSAL AS SHOWN IN FIGURE 2A. A PRIMARY CHARGE OF ONE OR TWO STICKS OF DYNAMITE WAS RAMMED TO THE BOTTOM OF THE PIPE AND EXPLODED SO AS TO OPEN A LARGE POCKET (FIG. 2B). THIS CAVITY WAS RAMMED COMPLETELY FULL OF DYNAMITE (FIG. 2C) AND EXPLODED. THE EFFECT SEEMED TO BE TO BLOW THE SOFT MATERIAL TOWARD THE SIDES OF THE ROAD, SINCE THIS WAS THE LINE OF LEAST RESISTANCE, THUS PERMITTING THE MAIN FILL TO SETTLE TO A SOLID BEARING AS ILLUSTRATED IN FIGURES 2D AND 3. THE DYNAMITING COST \$1,500.

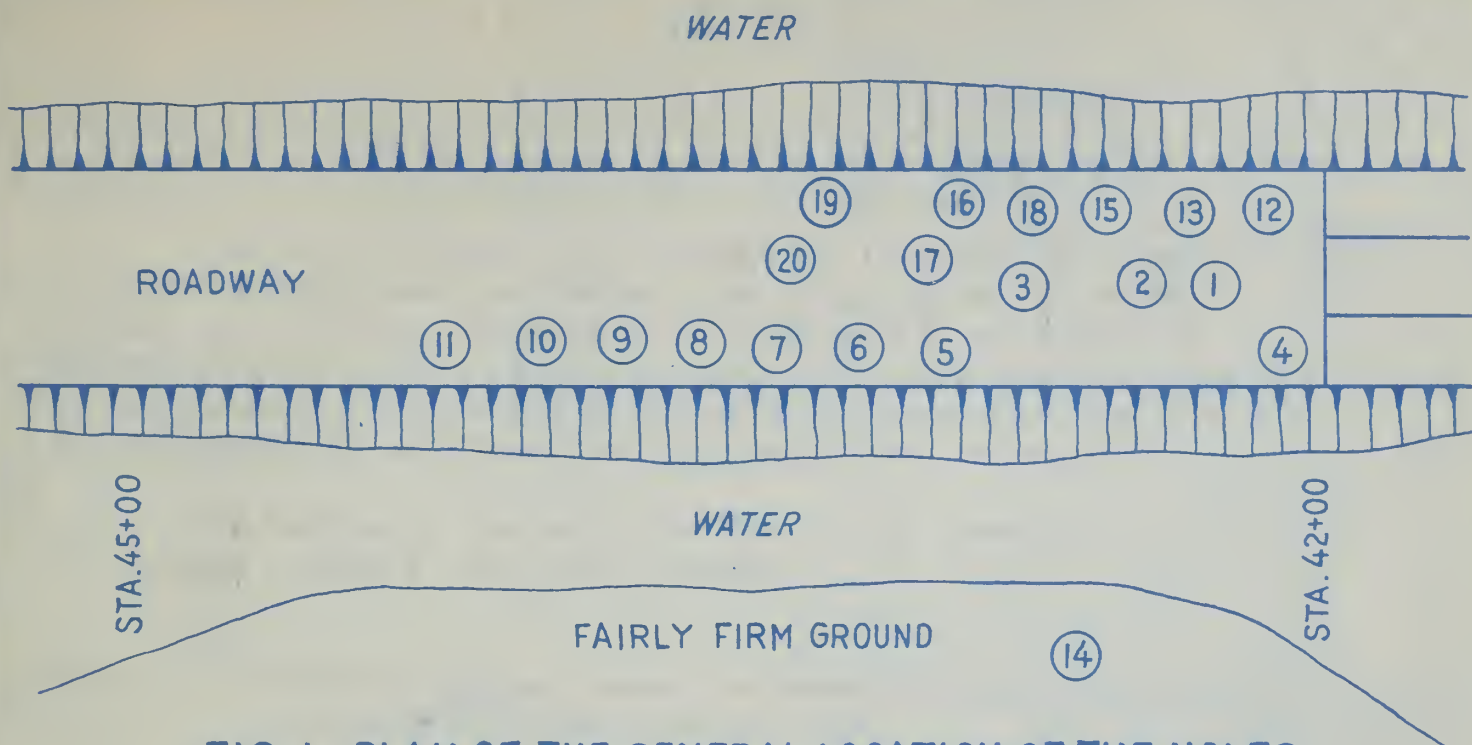


FIG. 1 - PLAN OF THE GENERAL LOCATION OF THE HOLES

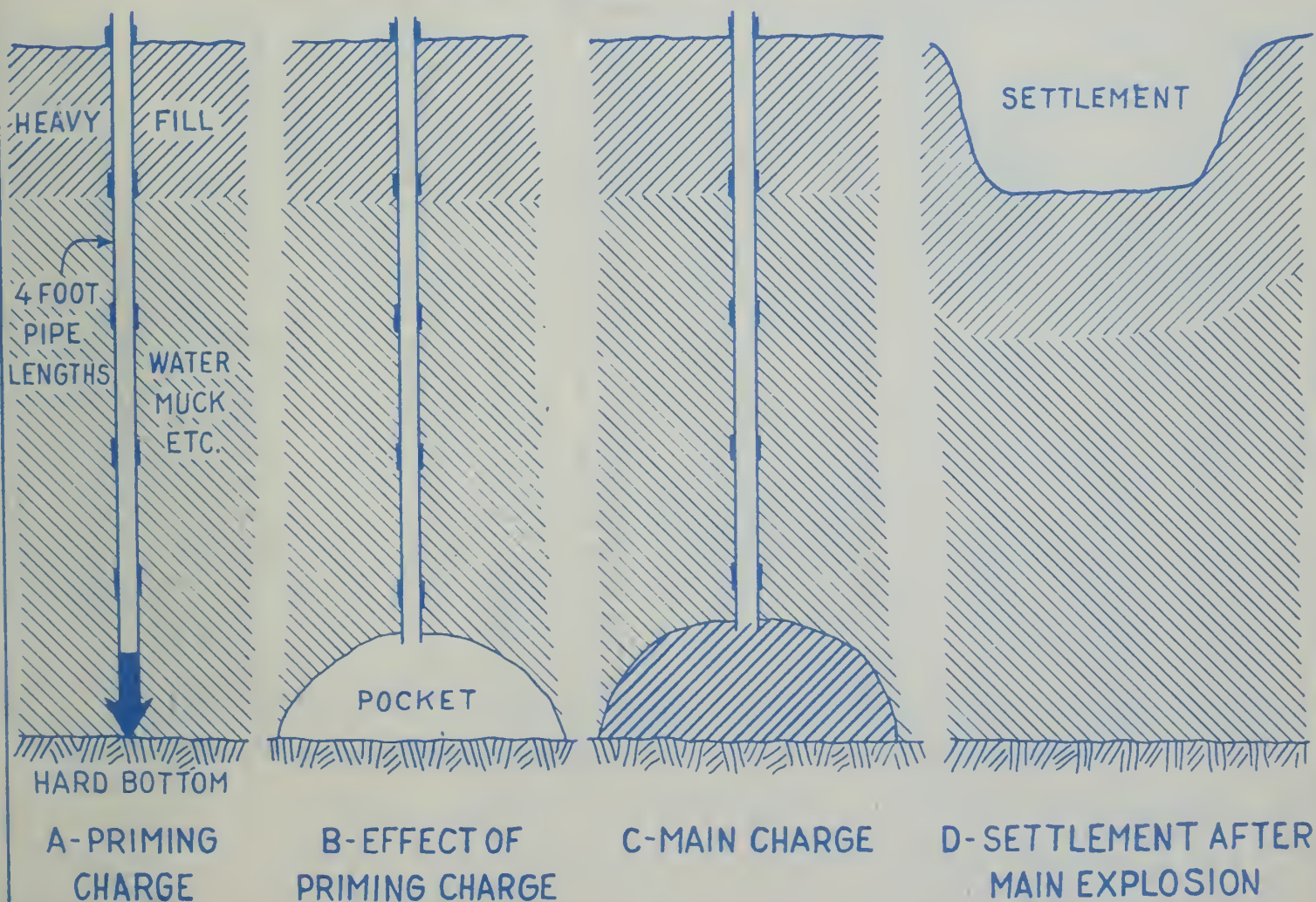


FIG. 2 - CROSS SECTIONS SHOWING THE METHOD OF LOADING THE HOLES AND THE EFFECT OF THE EXPLOSION

A TOTAL OF APPROXIMATELY 5,000 CUBIC YARDS OF EXTRA EMBANKMENT WAS PLACED ON THE SETTLED FILL. A RECENT REPORT STATES THAT AN AREA 150 FEET BY 14 FEET ALONG THE EAST SIDE OF THE SECTION SETTLED SOME 10 INCHES AFTER THE SURFACING HAD BEEN COMPLETED. THIS WAS RETOPPED AND APPEARED AT THE TIME OF THE REPORT TO BE STABLE UNDER FAIRLY HEAVY TRAFFIC.

THE DEPTHS OF THE HOLES, SIZES OF THE CHARGES, AND SETTLEMENT PRODUCED ARE SHOWN IN TABLE 1.

TABLE 1. - DEPTH OF HOLES, AMOUNT OF DYNAMITE USED AND THE OBSERVED SETTLEMENT OF THE FILL.

HOLE :	DEPTH :	DYNAMITE :	SETTLEMENT
NUMBER:	OF HOLE :	CHARGE :	OF FILL
:	FEET :	POUNDS :	FEET
1 :	27 :	25 :	1.0
2 :	28 :	160 :	1.5
3 :	27 :	150 :	2.0
4 :	27 :	150 :	2.5
5 :	25 :	150 :	3.0
6 :	18 :	150 :	4.0
7 :	24 :	150 :	5.5
8 :	21 :	200 :	5.0
9 :	20 :	105 :	6.0
10 :	18 :	210 :	6.0
11 :	20 :	150 :	5.5
12 :	23 :	100 :	2.5
13 :	18 :	100 :	4.0
14 :	39 :	225 :	0.5
15 :	19 :	125 :	3.5
*(16 :	18 :	165 :	6.0
(17 :	18 :	135 :	6.0
18 :	15 :	100 :	4.5
*(19 :	21 :	250 :	5.5
(20 :	21 :	150 :	5.5

*HOLES 2 FEET APART WHICH WERE FIRED SIMULTANEOUSLY.



U. S. BUREAU OF PUBLIC ROADS 31948



U. S. BUREAU OF PUBLIC ROADS 31949

FIGURE 3. - THE TOP VIEW SHOWS THE UNSTABLE SECTION BEFORE BLASTING AND THE BOTTOM PICTURE THE CONDITION AFTER BLASTING.

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS
APPORTIONMENTS AND APPROPRIATIONS FOR FOREST ROAD WORK
AS OF JUNE 30, 1926.

B.P.R.-F.R.-A-1
S-JULY 14, 1926-A

AUTHORIZED TO BE APPROPRIATED

ACTS OF CONGRESS	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	TOTAL
APPROVED JULY 11, 1916 (39 STAT-355)	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$10,000,000
APPROVED FEBRUARY 23, 1919 (40 STAT-1200)			3,000,000	3,000,000	3,000,000									9,000,000
APPROVED NOVEMBER 9, 1921 (42 STAT-212)						5,000,000	10,000,000							15,000,000
APPROVED JUNE 19, 1922 (42 STAT-660)								6,500,000	6,500,000					13,000,000
APPROVED FEBRUARY 12, 1925 (43 STAT-589)										7,500,000	7,500,000			15,000,000
APPROVED JUNE 22, 1926 (H. R. 9504)												7,500,000	7,500,000	15,000,000
TOTALS	\$ 1,000,000	\$ 1,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 6,000,000	\$11,000,000	\$ 7,500,000	\$ 7,500,000	\$ 8,500,000	\$ 7,500,000	\$ 7,500,000	\$ 7,500,000	\$77,000,000

APPROPRIATIONS

ACTS OF CONGRESS														
APPROVED JULY 11, 1916 (39 STAT-355)	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$10,000,000
APPROVED FEBRUARY 23, 1919 (40 STAT-1200)			3,000,000	3,000,000	3,000,000									9,000,000
APPROVED NOVEMBER 9, 1921 (42 STAT-212)						5,000,000	10,000,000							15,000,000
APPROVED FEBRUARY 26, 1923 (42 STAT-1321)								3,000,000						3,000,000
APPROVED JUNE 5, 1924 (43 STAT-460)								3,500,000	2,500,000					6,000,000
APPROVED FEBRUARY 10, 1925 (43 STAT-852)									4,000,000					4,000,000
APPROVED MARCH 3, 1926 (PUBLIC 36-69TH CONGRESS)										3,775,000				3,775,000
APPROVED MAY 11, 1926 (H.R. 3264-69TH CONGRESS)											1,275,000			1,275,000
TOTALS	\$ 1,000,000	\$ 1,000,000	\$ 4,000,000	\$ 4,000,000	\$ 4,000,000	\$ 6,000,000	\$11,000,000	\$ 7,500,000	\$ 7,500,000	\$ 3,725,000	\$ 1,275,000			\$55,775,000
BALANCE UNAPPROPRIATED											\$ 6,225,000	\$ 7,500,000	\$ 7,500,000	\$21,225,000

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PUBLIC ROADS

S.P.R.-F.R.-A-1
S-JULY 15, 1926-A

FOREST ROAD FUNDS

APPORTIONED TO STATES

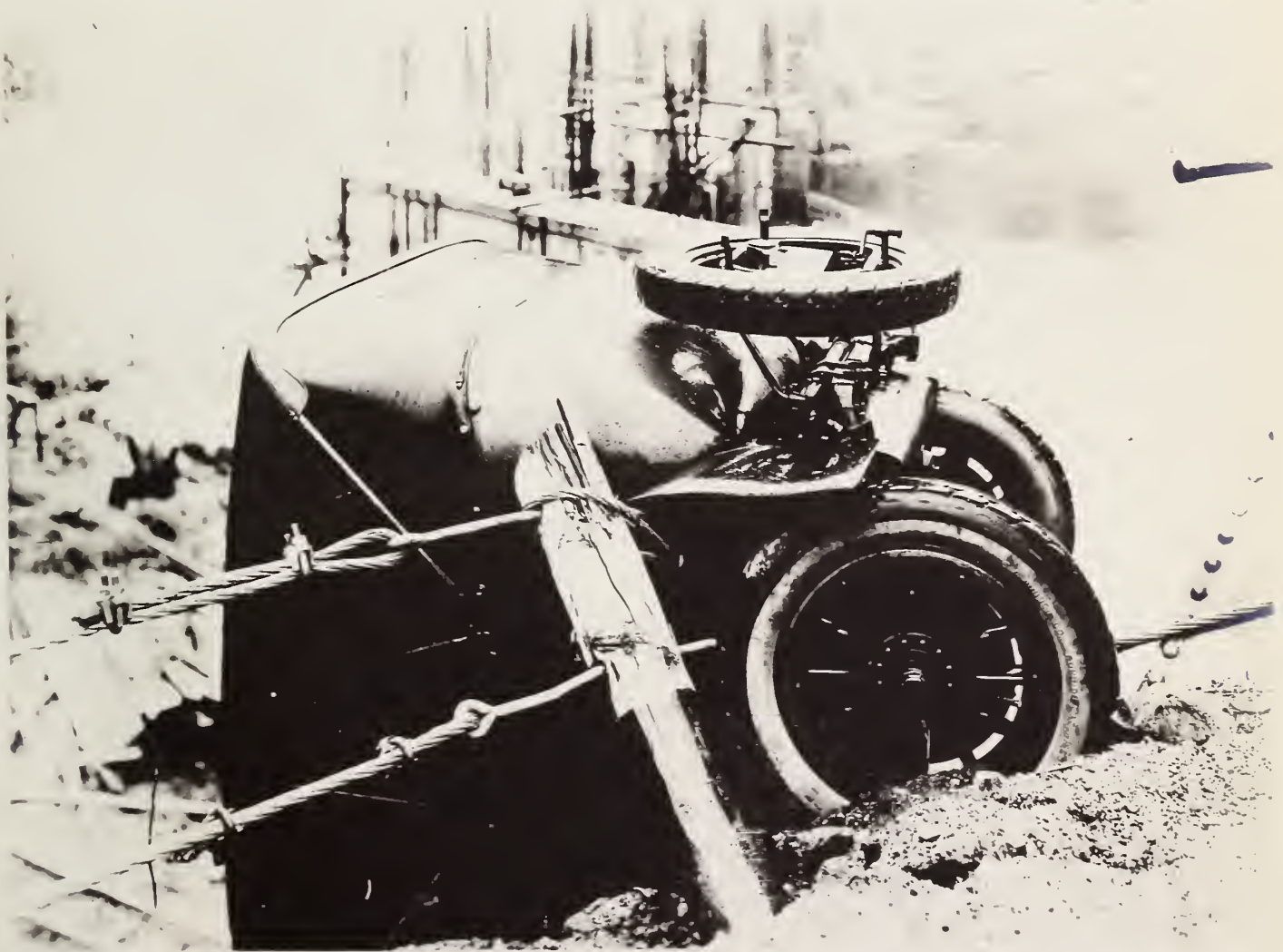
JULY 11, 1916 TO JUNE 30, 1926.

STATES	SECTION 3 FUND	F.F.R.O. FUND	FOREST HIGHWAY FUND	FOREST ROAD DEVELOPMENT FUND	TOTAL	STATES
ALABAMA	\$ 15,456.04	\$ 1,922.31	\$ 16,132.00	\$ 25,237.00	\$ 58,797.35	ALABAMA
ALASKA	485,938.82	132,895.97	2,624,932.00	135,745.00	3,419,562.79	ALASKA
ARIZONA	598,682.80	456,972.12	1,536,923.00	777,371.00	3,419,943.92	ARIZONA
ARKANSAS	172,711.40	129,689.59	193,553.00	247,022.00	737,980.99	ARKANSAS
CALIFORNIA	1,441,633.87	1,192,650.08	3,835,376.00	2,215,835.00	8,735,544.95	CALIFORNIA
COLORADO	752,522.20	773,000.04	1,513,727.00	1,000,396.00	4,444,635.24	COLORADO
FLORIDA	119,295.75	22,028.95	63,743.00	57,648.00	262,715.74	FLORIDA
GEORGIA	40,878.67	134,417.33	45,049.00	77,912.00	299,257.00	GEORGIA
IDAHO	1,137,883.85	1,350,323.21	2,908,370.00	3,513,583.00	3,576,160.06	IDAHO
ILLINOIS			337.00	150.00	577.00	ILLINOIS
KENTUCKY			1,595.00	3,226.00	4,821.00	KENTUCKY
MAINE	32.41	3,733.77	7,251.00	10,645.00	21,671.18	MAINE
MARYLAND			349.00		349.00	MARYLAND
MICHIGAN	7.00	3,000.00	12,016.00	42,710.00	57,733.00	MICHIGAN
MINNESOTA	7,630.16	108,352.36	167,996.00	237,667.00	521,695.52	MINNESOTA
MONTANA	739,070.16	732,570.45	2,317,174.00	1,973,202.00	5,762,016.61	MONTANA
NEBRASKA	13,387		25,825.00	24,472.00	53,315.98	NEBRASKA
NEVADA	123,837.23	92,692.76	552,989.00	94,366.00	923,862.99	NEVADA
NEW HAMPSHIRE			92,301.00	73,835.00	162,332.13	NEW HAMPSHIRE
NEW JERSEY	354.10	10,502.03	329.00	379.00	1,203.00	NEW JERSEY
NEW MEXICO	426,131.59	510,701.58	1,209,942.00	677,151.00	2,773,876.57	NEW MEXICO
NEW YORK			699.00	455.00	1,154.00	NEW YORK
NORTH CAROLINA	97,562.91	176,639.23	75,822.00	155,270.00	505,694.14	NORTH CAROLINA
NORTH DAKOTA	7.00				7.00	NORTH DAKOTA
OKLAHOMA	65.43	2,775.17	14,165.00	21,595.00	38,600.66	OKLAHOMA
OREGON	1,334,817.43	1,073,203.83	3,220,333.00	2,573,753.00	8,252,192.31	OREGON
PENNSYLVANIA	24.04	21.42	10,236.00	37,003.00	47,284.46	PENNSYLVANIA
PORTO RICO	7.00	3,343.09	3,753.00	11,255.00	19,358.09	PORTO RICO
SOUTH CAROLINA	467.96	43,220.75	6,237.00	28,732.00	83,717.71	SOUTH CAROLINA
SOUTH DAKOTA	32,853.73	79,777.92	202,916.00	132,150.00	497,697.65	SOUTH DAKOTA
TENNESSEE	73,349.43	28,351.50	54,375.00	96,070.00	248,147.33	TENNESSEE
UTAH	441,345.30	485,226.64	935,855.00	411,953.00	2,304,379.94	UTAH
VIRGINIA	60,965.31	71,404.89	73,501.00	150,415.00	361,636.20	VIRGINIA
WASHINGTON	931,774.30	716,042.75	1,330,126.00	1,972,983.00	5,500,896.05	WASHINGTON
WEST VIRGINIA	5,521.47	5,049.24	23,167.00	61,556.00	95,693.71	WEST VIRGINIA
WYOMING	459,919.47	542,401.43	1,274,301.00	713,114.00	2,996,735.95	WYOMING
MISCELLANEOUS	252,332.68	58,609.06	43,020.00	5,000.00	400,461.74	MISCELLANEOUS
TOTALS	\$10,000,000.00	\$ 9,000,000.00	\$ 25,500,000.00	\$ 17,500,000.00	\$ 62,000,000.00	TOTALS

WIRE-ROPE GUARD RAIL SAVES AUTOMOBILE FROM PLUNGING OFF EMBANKMENT.

CONTRIBUTED BY VERNON M. PEIRCE, DISTRICT ENGINEER.

THE ACCOMPANYING PHOTOGRAPH (FIG. 1) SHOWS THE LIFE-SAVING VALUE OF THE PENNSYLVANIA TYPE OF WIRE-ROPE GUARD RAIL. THE MACHINE WHICH WAS A FIVE-PASSENGER CADILLAC TOURING CAR, WEIGHING 4,200 POUNDS UNLOADED, CRASHED INTO THE GUY ROPE OF THE GUARD RAIL AT THE END OF A BRIDGE ON STATE ROUTE 333 IN YORK COUNTY, PA. THE REAR WHEEL AND AXLE CAUGHT IN THE WIRE CABLE AND THE MACHINE WAS PREVENTED FROM FALLING AND HELD ON THE SLOPE OF THE BRIDGE-APPROACH EMBANKMENT. UNDER SIMILAR CONDITIONS WITH A WOODEN GUARD RAIL IT IS PROBABLE THAT THE CAR WOULD HAVE BROKEN THROUGH THE RAIL AND CRASHED TO THE GROUND BELOW. IN FIGURE 2 IS SHOWN A DIMENSION DRAWING OF THE STANDARD PENNSYLVANIA GUARD RAIL.



U. S. BUREAU OF PUBLIC ROADS 31951

FIGURE 1. - STANDARD 3/4-INCH PENNSYLVANIA WIRE-ROPE RAIL SAVES AUTOMOBILE FROM PLUNGING FROM ROADWAY.

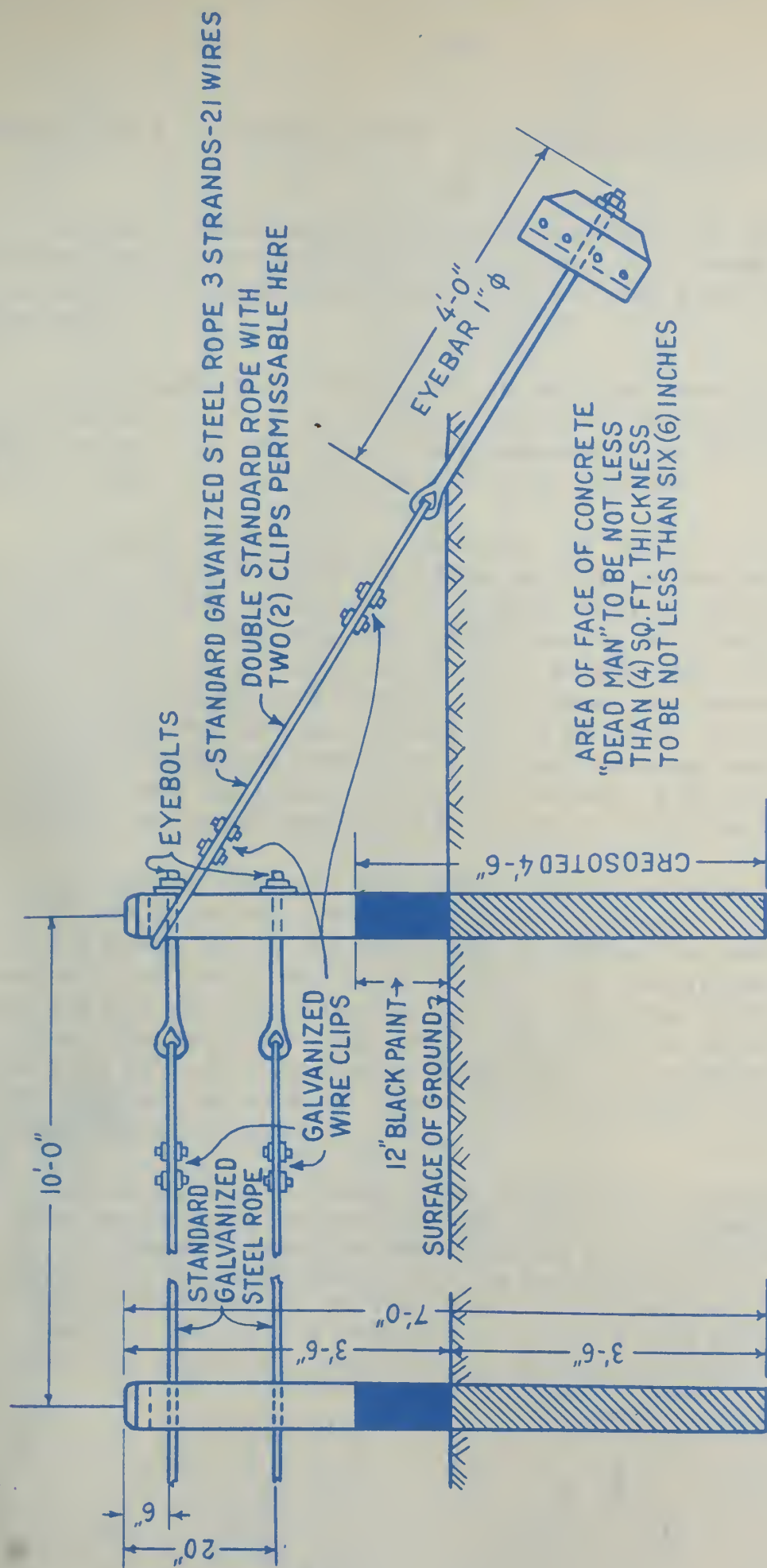


FIG. 2 - DIMENSION DRAWING OF STANDARD PENNSYLVANIA WIRE-ROPE GUARD RAIL

TRANSPORTATION SURVEYS BEGUN IN NEW HAMPSHIRE AND VERMONT

HIGHWAY TRANSPORTATION SURVEYS COVERING THE STATES OF NEW HAMPSHIRE AND VERMONT WERE BEGUN ON JULY 16 UNDER COOPERATIVE AGREEMENTS BETWEEN THE BUREAU AND THE TWO STATE HIGHWAY DEPARTMENTS.

AS PLANNED, THE SURVEYS ARE TO RUN FOR THREE MONTHS, WITH 13 RECORDING PARTIES TAKING DATA TWICE DURING THE PERIOD AT EACH OF THE 143 STATIONS IN NEW HAMPSHIRE AND 12 PARTIES RECORDING THE TRAFFIC AT 130 STATIONS IN VERMONT.

IN GENERAL THE SAME METHODS WILL BE USED AS IN THE CONNECTICUT AND COOK COUNTY SURVEYS, REPORTS OF WHICH HAVE BEEN PUBLISHED, AND THE PENNSYLVANIA AND OHIO SURVEYS WHICH ARE NOW BEING ANALYZED. FOR PASSENGER VEHICLES THE DATA WILL SHOW THE NUMBER OF VEHICLES PASSING THE STATION DURING EACH HOUR, THE STATE IN WHICH THEY ARE LICENSED, THE NUMBER OF PASSENGERS THEY CARRY, WHETHER THE PURPOSE OF TRAVEL IS BUSINESS OR PLEASURE, WHETHER PASSENGERS ARE FROM CITY OR FARM, WHETHER THE TRAVEL IS AN EXTENDED TOUR OR A SHORT TRIP, THE ORIGIN, DESTINATION, LENGTH OF TRIP AND THE NUMBER OF MILES OF TRAVEL WITHIN THE STATE.

FOR TRUCKS THE DATA WILL SHOW ALSO THE NUMBER PASSING EACH HOUR, THE STATE OF REGISTRATION, CAPACITY, ORIGIN AND DESTINATION, WITH INFORMATION AS TO THE CHARACTER OF OPERATION AND OF THE CONSIGNOR AND CONSIGNEE, THE TOTAL DISTANCE OF TRAVEL AND MILEAGE WITHIN THE STATE, THE COMMODITY TRANSPORTED, THE TYPE OF TRUCKING (FOR HIRE, CONTRACT HAULING, ETC.) AND THE SITUS OF OWNERSHIP. IN ADDITION TO THIS INFORMATION THERE WILL BE RECORDED AT SPECIAL-WEIGHT STATIONS THE MAKE OF TRUCK, TYPE OF TIRES, AND WEIGHTS ON THE FRONT AND REAR AXLES,

ANALYSIS OF THIS INFORMATION WILL MAKE IT POSSIBLE TO PREPARE MAPS SHOWING THE PRESENT VOLUME AND DISTRIBUTION OF PASSENGER VEHICLE AND TRUCK TRAFFIC ON THE HIGHWAYS OF EACH OF THE STATES, FROM WHICH THE STATE HIGHWAYS WILL BE CLASSIFIED AS INDUSTRIAL, HIGH, MEDIUM OR LOW-TYPE ROUTES, TAKING INTO ACCOUNT MOTOR TRUCK CAPACITIES AND LOADS. A FORECAST OF TRAFFIC FOR SEVERAL YEARS AHEAD WILL BE MADE AND A DEFINITE PROGRAM OF HIGHWAY CONSTRUCTION

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WORKED OUT. SPECIAL ATTENTION IS TO BE GIVEN TO AN ANALYSIS OF THE RELATIVE TRAFFIC IMPORTANCE OF THE TOWNSHIP ROADS WITH RESPECT TO THE PRIMARY AND SECONDARY SYSTEMS.

ECONOMIC DATA TO BE COLLECTED WILL INCLUDE INFORMATION CONCERNING THE TONNAGE SHIPPED BY MOTOR TRUCK, MARKETING METHODS, ZONES OF TRUCK OPERATION AND GENERAL TRUCKING PRACTICE.

SKETCH ON FEDERAL AID PLANS RECALLS PIONEER ROADS OF THE FAR WEST.
CONTRIBUTED BY THE DIVISION OF DESIGN

A DRAFTSMAN WITH A TASTE FOR HISTORY AND THE REMINISCENCES OF THE PIONEERS OF THE FAR WEST HAS LEFT HIS MARK ON THE BLUE-PRINTED PLANS FOR TEXAS FEDERAL-AID PROJECT NO. 60. THE PROJECT LIES IN SHACKLEFORD COUNTY BETWEEN THE TOWN OF ALBANY AND THE JONES COUNTY LINE.

AT STA. 222+50 ON THE BLUEPRINTED PLANS THE DRAFTSMAN HAS SKETCHED THE CROSSING OF THE OLD BUTTERFIELD TRAIL OF 1850. THE DISTANT MOUNTAINS AND NEARBY THE SKULL AND HORNS OF A STEER WITH VULTURES HOVERING OVER THE PARTIALLY DEVoured CARCASS LAY THE BACKGROUND FOR THE SCENE. TO THE RIGHT IS SKETCHED THE OLD STAGE COACH OF THE WILD AND ROMANTIC WEST. DRAWN BY 6 HORSES, TWO ABREAST, THE DRIVER IS GUIDING THE RUMBLING STAGE COACH ACROSS THE HOT, SANDY DESERT WITH A LONG WHIP IN HAND. BESIDE HIM, TO GUARD THE PASSENGERS AND THE MAIL AND PERHAPS GOLD BULLION, SITS THE CUSTOMARY TEXAS RANGER WITH A RIFLE RESTING ACROSS HIS KNEES. BY THE SIDE OF THE COACH ON HORSEBACK GALLOPS ANOTHER RANGER WITH A RIFLE IN THE HOLLOW OF HIS LEFT ARM. THE NAME OF THE ARTIST IN SMALL PRINT AT THE BOTTOM OF THE PICTURE IS GIVEN AS J. L. NEILL.

THE ARTIST EXPLAINS THE SKETCH WITH SUBSTANTIALLY THE FOLLOWING LETTERED DESCRIPTION: THE OLD BUTTERFIELD STAGE COACH TRAIL OF 1850 FROM THE END OF THE RAILROAD IN KANSAS TO THE GOLD FIELDS OF CALIFORNIA. AT THIS POINT THE MODERN HIGHWAY CROSSES THE OLD TRAIL OF THE STAGE COACH. FORT GRIFFIN, 15 MILES TO THE NORTHEAST, WAS AT ONE TIME THE METROPOLIS OF WEST TEXAS, BEING THE GREATEST CONCENTRATION POINT FOR BUFFALO HIDES IN THE SOUTHWEST. FORT PHANTOM HILL, 15 MILES TO THE SOUTHWEST, AND FORT CHADEBOURNE, 40 MILES BEYOND, WERE OTHER IMPORTANT POSTS IN THIS FORTIFIED TRAIL. ROBERT E. LEE, U. S. GRANT AND OTHER OFFICERS RECEIVED THEIR EARLY TRAINING AT THESE POSTS IN THE RELENTLESS WARFARE AGAINST THE SAVAGE COMANCHE OF

THE SOUTHERN PLAINS. THEY EVENTUALLY BROKE UP THE ANNUAL FORAYS OF THE INDIANS, MADE INTO MEXICO IN QUEST OF HORSES AND WOMEN UNDER THE LIGHT OF THE SEPTEMBER MOON.

ISSUE OF U. S. HIGHWAY MAP WITHHELD UNTIL AFTER FALL MEETING OF THE A.A.S.H.O.

CONTRIBUTED BY E. W. JAMES, CHIEF OF DIVISION OF DESIGN

THE MAP OF THE NUMBERED UNITED STATES HIGHWAYS WILL NOT BE ISSUED UNTIL AFTER THE EXECUTIVE COMMITTEE OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS HAS HELD A MEETING, WHICH IN THE ORDINARY COURSE OF THE ASSOCIATION'S BUSINESS, WILL NOT OCCUR UNTIL EARLY IN NOVEMBER OF THIS YEAR.

THIS DELAY HAS BEEN CAUSED BY THE DIFFICULTY OF DECIDING ON INTERSTATE ADJUSTMENTS AFFECTING THE UNITED STATES HIGHWAYS SELECTED FOR UNIFORM MARKING. THE EXECUTIVE COMMITTEE OF THE A.A.S.H.O. HAS DECIDED THAT THE FEW REMAINING QUESTIONS OF AN INTERSTATE CHARACTER MUST BE HELD PENDING THEIR CONSIDERATION AND DISCUSSION AT A MEETING OF THE COMMITTEE. SUCH MATTERS WILL, THEREFORE, NOT BE HANDLED BY CORRESPONDENCE OR LETTER BALLOT.

THE ADJUSTMENTS REMAINING TO BE MADE AFFECT ONLY THE ASSIGNMENT OF NUMBERS AND NOT THE LOCATION OF ROUTES. THE ASSOCIATION HAS ASKED THE BUREAU TO PROCEED AT ONCE WITH THE NECESSARY DRAFTING OF THE FINAL MAP FOR APPROVAL WITH THE EXPECTATION THAT THE STATES WILL AT THIS TIME MAKE NO FURTHER REQUESTS FOR ADDITIONS.

C. N. CONNER TAKES OVER EARTH ROAD RESEARCH WORK

C. N. CONNER, FORMERLY STATE CONSTRUCTION ENGINEER FOR THE NORTH CAROLINA STATE HIGHWAY COMMISSION AND UNTIL RECENTLY CHIEF ENGINEER OF THE MEXICAN NATIONAL HIGHWAY COMMISSION, HAS BEEN DESIGNATED CHAIRMAN OF THE EARTH ROADS INVESTIGATION WHICH IS BEING CONDUCTED UNDER THE AUSPICES OF THE HIGHWAY RESEARCH BOARD OF THE NATIONAL RESEARCH COUNCIL. THIS ANNOUNCEMENT HAS BEEN MADE BY CHARLES M. UPHAM, DIRECTOR OF THE BOARD, WHO STATES THAT MR. CONNER WILL GIVE HIS FULL TIME TO THIS WORK, CONTINUING THE INVESTIGATION OF INTERMEDIATE-TYPE ROAD TREATMENTS AND EXPERIMENTS FROM THE PRELIMINARY STAGES THROUGH WHICH THEY HAVE THUS FAR BEEN CONDUCTED.

WHY RIGHTS OF WAY ACQUIRED FROM RAILROADS DIFFER FROM OTHER RIGHTS OF WAY.

CONTRIBUTED BY THE LEGAL SECTION.

THE INSISTENCE OF THE WASHINGTON OFFICE ON HAVING COPIES OF GRANTS OF RIGHTS OF WAY BY RAILROADS IN THE CASE OF FEDERAL-AID PROJECTS WHICH MAKE ENCROACHMENTS ON RAILROAD PROPERTY HAS CAUSED AN INQUIRY FROM FIELD SOURCES AS TO WHY GRANTS OF RAILROAD RIGHTS OF WAY ARE TREATED DIFFERENTLY FROM OTHER CLASSES OF RIGHTS OF WAY OVER PROPERTY WHICH MAY BE CROSSED BY FEDERAL-AID PROJECTS. THE QUESTION HAS BEEN ASKED AS TO WHETHER THERE IS ANY GOOD REASON FOR MAKING THIS DISTINCTION BETWEEN RAILROAD RIGHTS OF WAY OVER OTHER PROPERTY FOR WHICH COPIES OF OTHER GRANTS OR EASEMENTS ARE NOT REQUIRED; AND THE SUGGESTION HAS BEEN MADE THAT IN ALL CASES IT SHOULD BE SUFFICIENT FOR THE DISTRICT OFFICES TO SUBMIT A STATEMENT BASED UPON INFORMATION FURNISHED BY THE STATES, THAT THE RIGHT OF WAY HAS BEEN FULLY AND UNCONDITIONALLY SECURED IN THE FORM OF A LEASE OR GRANT, AND IF UNDER A CONDITIONAL GRANT THAT THERE SHOULD BE INSERTED IN THE PROJECT AGREEMENT A CLAUSE TO PROVIDE THAT IN CASE THE RAILROAD COMPANY SHOULD RETAKE POSSESSION OF THE RIGHT OF WAY THE HIGHWAY DEPARTMENT WOULD, AT ITS OWN EXPENSE, AND WITHOUT FEDERAL AID, RELOCATE AND RECONSTRUCT THE HIGHWAY ON A NEW LOCATION. IT, THEREFORE, MAY NOT BE AMISS TO EXPLAIN OUR ATTITUDE UPON THIS QUESTION OF RIGHTS OF WAY.

RAILROAD PROPERTY IS NOT TREATED THE SAME AS PRIVATE PROPERTY FOR THE REASON THAT THE STATE HAS THE RIGHT, BY VIRTUE OF ITS POWER OF EMINENT DOMAIN, TO CONDEMN THE LATTER FOR PUBLIC PURPOSES. SUCH IS NOT ALWAYS THE CASE WITH THE RAILROAD PROPERTY, WHICH ITSELF IS DEVOTED TO A PUBLIC NEED, AND THE QUESTION OF THE PARAMOUNT PUBLIC NECESSITY MAY HAVE TO BE CONTESTED IN CASE OF A DISPUTE WITH THE RAILROAD COMPANY OVER A RIGHT OF WAY UPON ITS PROPERTY. IT IS ONLY IN EXCEPTIONAL CASES THAT THE BUREAU SHOULD ACCEPT ANYTHING SHORT OF EITHER AN OUTRIGHT GRANT OR A LONG-TERM LEASE WHERE ENCROACHMENT IS MADE ON RAILROAD PROPERTY. WHEN THE RAILROAD COMPANY INSISTS ON A PROVISION IN ITS LEASE THAT AFTER WRITTEN NOTICE IT MAY RETAKE THE PROPERTY WITHIN A COMPARATIVELY SHORT TIME, THERE IS SURE TO BE A LOSS OF THE PUBLIC FUNDS EXPENDED IN THE ORIGINAL IMPROVEMENT IF SUCH RIGHT IS EXERCISED. THE FACT THAT IN SUCH EVENT THE STATE WILL AGREE TO RELOCATE THE HIGHWAY WITHOUT EXPENSE TO THE FEDERAL GOVERNMENT WILL NOT ALTER THE SITUATION, AS THE BUREAU DOES NOT DESIRE TO

BE IN A POSITION OF APPROVING PROJECTS ON RIGHTS OF WAY WHICH MAY LATER HAVE TO BE ABANDONED WITH THE ENTIRE BURDEN OF THEIR RELOCATION AND RECONSTRUCTION PLACED UPON THE LOCAL PEOPLE. IT IS ONLY IN CASES WHERE THE LOCATION OF A HIGHWAY ON RAILROAD PROPERTY CAN NOT BE REASONABLY AVOIDED, AND WHERE THERE IS NO ALTERNATIVE BUT TO ACCEPT A SHORT TERM LEASE, THAT SUCH A LEASE SHOULD BE ACCEPTED AND A PROJECT APPROVED WITH A CLAUSE IN THE AGREEMENT REQUIRING ITS RELOCATION AND RECONSTRUCTION AT THE SOLE EXPENSE OF THE STATE IN CASE THE RAILROAD SHOULD RESUME POSSESSION OF ITS PROPERTY.

THE SUGGESTION THAT IT SHOULD BE SUFFICIENT FOR THE DISTRICT OFFICES TO SUBMIT A STATEMENT, BASED UPON INFORMATION OBTAINED FROM THE STATES, THAT PROPER PROVISION FOR RIGHT OF WAY HAS BEEN MADE CAN NOT BE ACCEPTED WHERE ENCROACHMENT IS MADE ON RAILROAD PROPERTY. EVEN FROM RAILROADS WHICH PREVIOUSLY HAD SHOWN A WILLINGNESS TO GIVE GRANTS WHICH WOULD BE ENTIRELY SATISFACTORY, THERE HAVE BEEN SUBMITTED FOR APPROVAL PROPOSED RIGHTS OF WAY GRANTED SUBJECT TO SUCH CONDITIONS AND LIMITATIONS THAT THE BUREAU COULD NOT REGARD AS SATISFACTORY. IN FACT, THERE HAVE BEEN SOME INSTANCES WHERE THE RAILROAD GRANTS PROPOSED FOR ACCEPTANCE AMOUNTED TO NOTHING MORE THAN REVOCABLE LICENSES. IT IS VERY INADVISABLE TO LOCATE A HIGHWAY ON RAILROAD PROPERTY UNDER SUCH A GRANT, AS IT INVOLVES THE SPENDING OF PUBLIC FUNDS IN THE MAKING OF A PUBLIC IMPROVEMENT ON PROPERTY FROM WHICH IT MAY HAVE TO BE REMOVED, AND MAY INVOLVE THE STATE OR COUNTY IN CONTROVERSY OR LITIGATION WITH THE RAILROAD. FURTHERMORE, IT HAS BEEN FOUND THAT IN A GREAT MANY INSTANCES WHERE AT FIRST THERE HAS BEEN A DISPOSITION TO ACCEPT SUCH GRANTS IT HAS BEEN POSSIBLE LATER TO OBTAIN TERMS FROM THE RAILROADS THAT WERE ENTIRELY SATISFACTORY AFTER OBJECTION WAS RAISED BY THE BUREAU. SOME OF THE RAILROADS HAVE GIVEN RIGHTS OF WAY BY OUTRIGHT GRANTS IN FEE SIMPLE, AND SOME HAVE GIVEN FIFTY-YEAR LEASES WITH A RESERVATION THAT IF IT SHOULD BECOME NECESSARY TO REMOVE THE HIGHWAY THEREFROM IT WOULD RELOCATE AND REESTABLISH THE SAME ON A NEW RIGHT OF WAY TO BE PROVIDED BY THE STATE OR COUNTY, OR, AT ITS OPTION, TO REIMBURSE THE STATE THE COST OF RECONSTRUCTING THE HIGHWAY ON THE NEW LOCATION.

BRIEF OF THE MINUTES OF THE MEETING OF THE COMMITTEE
ON TESTS AND INVESTIGATIONS OF THE A.A.S.H.O.

CONTRIBUTED BY THE DIVISION OF TESTS.

A MEETING OF THE COMMITTEE ON TESTS AND INVESTIGATIONS OF THE AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS WAS HELD AT THE HEADQUARTERS OFFICE OF THE BUREAU ON JUNE 21-22, 1926, WITH REPRESENTATIVES OF SIXTEEN STATES AND THE BUREAU IN ATTENDANCE.

THE COMMITTEE CONSIDERED SEVERAL MATTERS OF IMPORTANCE, INCLUDING VARIOUS PROPOSED CHANGES AND REVISIONS IN THE METHODS OF TESTING HIGHWAY MATERIALS AS GIVEN IN U. S. DEPARTMENT OF AGRICULTURE BULLETIN No. 1216, AND SUGGESTED NEW SPECIFICATIONS AND CHANGES AND REVISIONS OF THE EXISTING SPECIFICATIONS OF THE ASSOCIATION. SLIGHT CHANGES IN SEVERAL OF THE METHODS OF TESTS WERE APPROVED SO AS TO BRING THEM STRICTLY UP TO DATE. IF THE CHANGES PROPOSED AT THIS MEETING ARE ADOPTED BY THE ASSOCIATION THESE, AS WELL AS THE CHANGES AND REVISIONS IN THE BULLETINS THAT WERE ADOPTED AT THE MEETING OF THE ASSOCIATION HELD SEPTEMBER 29-30, 1925, WILL BE INCORPORATED IN A REVISION OF BULLETIN 1216 WHICH WILL PROBABLY BE UNDERTAKEN SHORTLY.

THE PRINCIPAL REVISIONS AND SPECIFICATIONS ADOPTED WERE IN CONNECTION WITH THE SPECIFICATION FOR PORTLAND CEMENT, BLAST-FURNACE SLAG AND BITUMINOUS SAND. IN THE CASE OF PORTLAND CEMENT, THE PROPOSED NEW SPECIFICATION FOR STRENGTH, OF THE AMERICAN SOCIETY FOR TESTING MATERIALS, OF 225 POUNDS PER SQUARE INCH AT SEVEN DAYS AND 325 POUNDS PER SQUARE INCH AT 28 DAYS WERE ADOPTED. IN THE SPECIFICATION FOR BLAST-FURNACE SLAG FOR ROAD CONSTRUCTION, THE REQUIREMENTS FOR PERCENTAGE OF WEAR FOR BROKEN SLAG FOR BITUMINOUS MACADAM SURFACE COURSE, BITUMINOUS CONCRETE SURFACE COURSE AND PORTLAND CEMENT SURFACE COURSE WERE RAISED FROM 10.0 TO 12.0. IN THE CASE OF BROKEN SLAG FOR WATERBOUND MACADAM BASE, THE REQUIREMENT FOR PERCENTAGE OF WEAR WAS RAISED FROM 15.0 TO 20.0. IN THE SPECIFICATIONS FOR BITUMINOUS SAND, THE GRADING REQUIREMENTS WERE CHANGED SO AS TO PROVIDE FOR THE USE OF No. 10, No. 40, AND No. 80 MESH SIEVES INSTEAD OF THE No. 8, 14, 28, 48, AND No. 65 AS IN THE PRESENT SPECIFICATION.

AMONG OTHER MATTERS CONSIDERED BY THE COMMITTEE WAS THE QUESTION OF COOPERATIVE RESEARCH TO BE UNDERTAKEN DURING THE COMING YEAR. INVESTIGATIONS IN CONNECTION WITH BITUMINOUS MATERIALS WHICH WILL BE STUDIED ARE AS FOLLOWS:

1. INVESTIGATIONS RELATIVE TO THE DEVELOPMENT OF A METHOD FOR THE RECOVERY OF BITUMEN FROM BITUMINOUS AGGREGATES WHEN IT IS DESIRED TO DETERMINE THE PROPERTIES OF THE EXTRACTED BITUMEN.

2. INVESTIGATIONS RELATIVE TO THE DEVELOPMENT OF A METHOD FOR THE DEHYDRATION OF ROCK ASPHALTS PREPARATORY TO THEIR EXAMINATION.

3. CONTINUATION OF THE INVESTIGATION FOR THE DEVELOPMENT OF METHODS FOR MAKING PHYSICAL TESTS ON BITUMINOUS MIXTURES.

RESEARCH PROBLEMS TO BE UNDERTAKEN BY THE NON-BITUMINOUS SUBCOMMITTEE WERE ALSO CONSIDERED AND THE FOLLOWING SIX MAJOR PROBLEMS WERE SELECTED FOR STUDY:

1. USE OF CALCIUM CHLORIDE IN CONCRETE, BOTH AS AN ACCELERATOR AND FOR CURING.

2. STANDARDIZATION OF THE CONSISTENCY TEST.

3. DEVELOPMENT OF METHODS FOR USING SANDS WHICH DO NOT MEET OUR PRESENT SPECIFICATIONS, ESPECIALLY AS REGARDS THE STRENGTH RATIO.

4. STANDARDIZATION OF METHODS OF TESTING AND SPECIFICATIONS FOR GRAVEL, ESPECIALLY FOR USE IN PORTLAND CEMENT CONCRETE.

5. STANDARDIZATION OF METHODS FOR MAKING THE TRANSVERSE TEST ON CONCRETE.

6. CONTINUATION OF OUR PRESENT INVESTIGATION ON "EFFECT OF TENSILE STRENGTH OF CEMENT ON STRENGTH OF CONCRETE, BOTH TRANSVERSE AND COMPRESSIVE."

BRIEF OF THE MINUTES OF THE 29TH ANNUAL MEETING OF THE A.S.T.M.

CONTRIBUTED BY THE DIVISION OF TESTS.

THE TWENTY-NINTH ANNUAL MEETING OF THE AMERICAN SOCIETY FOR TESTING MATERIALS WAS HELD IN ATLANTIC CITY DURING THE LAST WEEK IN JUNE. NUMEROUS MATTERS OF INTEREST TO THE HIGHWAY ENGINEER WERE DISCUSSED AT THE ROAD MATERIALS, CEMENT AND CONCRETE SESSIONS.

DURING THE SESSION ON ROAD MATERIALS, THE REPORT OF COMMITTEE D-4 ON ROAD AND PAVING MATERIALS, UNDER THE CHAIRMANSHIP OF H. S. MATTIMORE, ENGINEER OF TESTS AND MATERIALS INVESTIGATIONS, OF THE PENNSYLVANIA STATE HIGHWAY DEPARTMENT, WAS PRESENTED. THE COMMITTEE PROPOSED FOR CONSIDERATION NEW SPECIFICATIONS FOR MINERAL FILLER FOR SHEET ASPHALT AND BITUMINOUS CONCRETE PAVEMENTS, ASPHALT FILLER FOR BRICK PAVEMENTS (BLOWN TYPE) AS WELL AS PROPOSED TENTATIVE METHODS OF TESTS FOR BITUMINOUS EMULSIONS, DISTILLATION OF BITUMINOUS MATERIAL SUITABLE FOR ROAD TREATMENT, AND RESIDUE OF SPECIFIED PENETRATION.

CERTAIN RECOMMENDATIONS WERE ALSO MADE BY THE COMMITTEE RELATIVE TO THE FOLLOWING EXISTING STANDARD AND TENTATIVE STANDARD SPECIFICATIONS AND METHODS OF TEST:

STANDARD METHOD OF TEST FOR ABRASION OF ROAD MATERIALS.

STANDARD METHOD OF TEST FOR SOFTENING POINT OF BITUMINOUS MATERIALS.

STANDARD SPECIFICATION FOR BLOCK FOR GRANITE BLOCK PAVEMENTS.

STANDARD SPECIFICATIONS FOR ASPHALT CEMENT OF 40-50 AND 50-60 PENETRATION.

STANDARD METHOD OF TEST FOR SPECIFIC GRAVITY OF ROAD OILS, ROAD TARS, ASPHALT CEMENTS AND SOFT TAR PITCHES.

STANDARD METHOD OF TEST FOR DETERMINATION OF BITUMEN.

1871

1872

1873

1874

1875

1876

1877

1878

1879

1880

1881

1882

1883

1884

STANDARD METHOD OF TEST FOR DETERMINATION OF THE PROPORTION OF BITUMEN SOLUBLE IN CARBON TETRACHLORIDE.

STANDARD METHOD OF TEST FOR DUCTILITY OF BITUMINOUS MATERIALS.

AT THE SESSION ON CEMENT HELD FRIDAY MORNING, THE REPORT OF THE TECHNICAL COMMITTEE ON CEMENT RECOMMENDING NUMEROUS CHANGES AND REVISIONS OF THE PRESENT STANDARD SPECIFICATION FOR PORTLAND CEMENT WAS PRESENTED. THE MOST IMPORTANT OF THESE SUGGESTED CHANGES WAS A RECOMMENDATION THAT THE TENSILE STRENGTH REQUIREMENT BE RAISED FROM 200 TO 225 POUNDS PER SQUARE INCH AT 7 DAYS AND FROM 300 TO 325 POUNDS PER SQUARE INCH AT 28 DAYS. SEVERAL OTHER RECOMMENDATIONS INVOLVING CHANGES IN THE METHODS OF TESTING WERE PRESENTED AND ADOPTED BY THE MEETING. THE COMMITTEE RECOMMENDED THAT ALL CHANGES IN THE SPECIFICATIONS AND METHODS OF TESTS BE REFERRED BY LETTER BALLOT TO THE SOCIETY AND, IF ACCEPTED, THAT THE REVISED SPECIFICATIONS BE MADE STANDARD IMMEDIATELY THEREAFTER.

AT THE SESSION ON CONCRETE, A REPORT OF THE COMMITTEE ON CONCRETE AND CONCRETE AGGREGATES WAS PRESENTED, AT WHICH CERTAIN REVISIONS OF THE TENTATIVE SPECIFICATIONS FOR CONCRETE AGGREGATES WERE PROPOSED.

PROGRESS OF FEDERAL HIGHWAY LEGISLATION

S. 4530 - INTRODUCED IN THE SENATE ON JUNE 28 BY SENATOR ODDIE OF NEVADA. IT WAS TWICE READ AND REFERRED TO THE COMMITTEE ON POST OFFICES AND POST ROADS. THE FIRST SESSION OF THE 69TH CONGRESS CLOSED WITHOUT ANY FURTHER ACTION ON THIS LEGISLATION.

THIS BILL PROPOSES TO AMEND SECTION 11 OF THE FEDERAL HIGHWAY ACT, APPROVED NOVEMBER 9, 1921, BY ADDING AT THE END OF THE SECOND PARAGRAPH A PROVISION FOR INCREASED FEDERAL AID IN INDIAN RESERVATIONS. IT PROVIDES THAT IN ANY STATE IN WHICH THE UNAPPROPRIATED PUBLIC LANDS AND NON-TAXABLE INDIAN LANDS EXCEED 5 PER CENT OF THE TOTAL AREA OF THE STATE, AND IN WHICH THE LATEST FEDERAL CENSUS SHOWS THAT THE POPULATION OF THE STATE DOES NOT EXCEED TEN PER SQUARE MILE, THAT THE SECRETARY OF AGRICULTURE MAY APPROVE PAYMENT BY THE FEDERAL GOVERNMENT ON PROJECTS ON THE FEDERAL-AID HIGHWAY SYSTEM OF ANY PERCENTAGE OF ITS COST UP

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CHICAGO, ILL. 60637

TO THE PRESIDENT OF THE UNIVERSITY OF CHICAGO
FROM THE DEAN OF THE FACULTY
The Faculty of the University of Chicago
has the honor to acknowledge the receipt of your letter of the 10th inst.
and to express its appreciation of the interest and attention which
you have given to the subject of the proposed new building for the
Department of Chemistry. The Faculty is deeply indebted to you for
the prompt and efficient manner in which you have handled this
matter. It is the hope of the Faculty that the new building will
be completed in time to accommodate the needs of the Department
and to provide a suitable and modern laboratory for the work of the
Department.

Very respectfully,
The Dean of the Faculty

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Department.

TO AND INCLUDING THE WHOLE COST OF THE PROJECT.
IN NO CASE, HOWEVER, SHALL THE TOTAL ANNUAL FEDERAL-
AID ALLOTTED EXCEED THE PRO RATA SHARE PAYABLE TO
THE STATES UNDER THE CUSTOMARY PROVISIONS.

THIS BILL ALSO PROPOSES TO AMEND THE LIMITATION OF THE
PAYMENT OF FEDERAL FUNDS PER MILE AS PRESCRIBED IN
PARAGRAPH 4 OF SECTION 4 OF THE POST OFFICE DEPART-
MENT APPROPRIATION BILL FOR THE FISCAL YEAR ENDING
JUNE 30, 1923. IT PROPOSES THAT THE SECRETARY OF
AGRICULTURE MAY MAKE PAYMENTS IN EXCESS OF THE ABOVE
LIMITATIONS PER MILE IN THE CASE OF ANY PROJECT IN-
VOLVING CONSTRUCTION IN MOUNTAINOUS, SWAMPY OR FLOOD
LANDS, ON WHICH THE AVERAGE COST PER MILE FOR THE
GRADING AND DRAINAGE STRUCTURES, OTHER THAN BRIDGES
OF MORE THAN TWENTY FEET CLEAR SPAN, WILL EXCEED
\$10,000. THIS INCREASE ALSO APPLIES TO PROJECTS
IN LOCALITIES WHERE THE DENSITY OF POPULATION IS
CONSIDERED GREAT ENOUGH TO WARRANT A WIDTH OF ROAD-
WAY IN EXCESS OF 18 FEET. IN NO EVENT, HOWEVER,
SHALL THE PAYMENTS ON A PROJECT EXCEED 50 PER CENT
OF THE COST OF THE PROJECT, EXCEPT AS SUCH INCREASED
PAYMENTS HAVE BEEN AUTHORIZED IN THE PUBLIC-LAND
STATES.

THE BILL FURTHER PROVIDES THAT IN APPORTIONING APPRO-
PRIATIONS HEREAFTER AUTHORIZED OR APPROPRIATED FOR
FOREST ROADS IN ACCORDANCE WITH THE PROVISIONS OF
THE SECOND PARAGRAPH OF CLAUSE (A) OF SECTION 23
OF THE FEDERAL HIGHWAY ACT OF NOVEMBER 9, 1921, AS
AMENDED, NO STATE ENTITLED TO SHARE IN SUCH APPRO-
PRIATIONS SHALL RECEIVE LESS THAN \$20,000 OF EACH
YEAR'S ALLOTMENT.

THE BILL CONCLUDES BY REPEALING ALL ACTS IN CONFLICT
WITH ITS PROVISIONS AND MAKES THE PROVISIONS EFFEC-
TIVE ON THE DATE OF PASSAGE.

